

SOME SIAMESE TABANIDAE.

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The potentialities of Siam as a field for discovery have hitherto been almost entirely neglected by collectors of Diptera, and in consequence, apart from an occasional description of a new species, little or nothing has been published upon the Siamese representatives of this Order. It follows that the only available method of making determinations of such material is the exceedingly laborious and wearisome one of reading through descriptions of the older authors like Wiedemann and Macquart, which, though based on types collected in other parts of the Oriental Region, may possibly be found to apply to one or other specimen from Siam.

The following little paper has been prepared in the hope not only of doing something to facilitate the study of Siamese TABANIDAE, but also of arousing interest among those who have the opportunity of collecting these insects within the confines of the kingdom of our eastern ally, so that our knowledge may ere long be extended. The fact that the present paper records only a single species in the case of *Chrysops*, and two species in that of *Haematopota*, is sufficient indication of its incompleteness; of the latter genus, at any rate, it is almost certain that many more than two species are to be found in Siam.

The basis of the paper is a small but interesting collection of Siamese TABANIDAE, recently formed and presented to the British Museum (Natural History), by Dr. M. E. Barnes, of the Rockefeller Foundation, New York, and now of Bangkok. In expressing to Dr. Barnes the grateful thanks of the Museum for his kindness, the author desires to draw attention to the interesting field-notes accompanying many of the specimens, which greatly enhance the value of the collection. As a stimulus to others towards further effort in the same direction, it may be pointed out that, of the seven species of *Tabanus* obtained by Dr. Barnes, no fewer than five appear to be new.

In order, so far as possible, to extend the scope of the paper, the small amount of Siamese Tabanid material previously in the National Collection has been studied in conjunction with Dr. Barnes's specimens and recorded, or, where necessary, described, in the following pages. Unless otherwise stated, however, every specimen mentioned was collected by Dr. Barnes.

It is only necessary to add that the types and paratypes of all new species included in the present paper are in the British Museum (Natural History).

PANGONIINAE.

Genus *Chrysops*, Mg.*Chrysops flavocincta*, Ric.

Chrysops flavocinctus, Ricardo, Ann. Mag. Nat. Hist. (7) ix, p. 380 (May 1902).

Three ♀♀, Doi Chom Chang, near Chiangmai, 16.iv.1921. With reference to these specimens, Dr. Barnes writes: "Caught on Doi Chom Chang, while attacking me in a cottage. These flies are very common on the mountain in that region, and are extremely troublesome at a sanatorium situated at an altitude of about 2,500 ft. They were never reported from the top of the mountain (5,500 ft.) until a few cottages were built there, but since that time they are to be found on the peak also.

"They attack very cautiously, approaching their victim from behind, and rarely making for the face. In flight, they somewhat resemble 'Hover-flies,' noiselessly approaching and settling upon the ears, back of the neck, legs, back of the hands, and on the exposed elbows. It is only the severe pain of the bite that attracts the victim's attention, and should the sufferer make the slightest movement, the flies at once effect their escape.

"The wound made by their bite is very painful, and causes much swelling in many people. A minute bleb forms at the site of the puncture, and if the contents be expressed the irritation usually subsides, though the pain and intense itching may persist for several days. If these wounds become infected, as is frequently the case in children, who are very apt to scratch them, they heal very slowly.

"This insect is by far the most troublesome biting fly in the Doi Chom Chang region."

Specimens of *Chrysops flavocincta* already in the National Collection show that the area of distribution of this species, which is one of the smallest of the Oriental representatives of its genus at present known, includes Ceylon, North-eastern India (Khasi Hills, Assam), and Borneo (Sarawak).

TABANINAE.

Genus *Haematopota*, Mg.

Haematopota pachycera, Big.

Haematopota pachycera, Bigot, Nouv. Archiv. Mus. Hist. Nat., Paris (3) ii, p. 206 (1890).

Haematopota validicornis, Ricardo, Rec. Ind. Mus., iv, p. 333, pl xvii, fig. 23 (1911).

Although this species is not represented in Dr. Barnes's collection, the British Museum (Natural History) possesses a few examples of it from Siam, viz.: 2 ♀♀, precise locality unknown, vi.1906 (*W. Palmer*); 1 ♀ (type of *H. validicornis*, Ric.), Biserat, 20.x.1901, "in spider's web in jungle" (*Robinson and Annandale*); 1 ♀, Phrapatoon,* 1907 (*Dr. P. G. Woolley*). In addition to the foregoing, the National Collection contains a ♀ of *H. pachycera* from the Federated Malay States (*Dr. A. T. Stanton*, presented by the Imperial Bureau of Entomology).

According to the describer of the species, the type of *H. pachycera* was obtained in the Laos Protectorate, French Indo-China; Miss Ricardo, however, who examined the specimen in the Paris Museum, states (*Ann. Mag. Nat. Hist.* (8) i, p. 59 (1908)) that it is from Cambodia.

Haematopota cilipes, Big.

Haematopota cilipes, Bigot, Nouv. Archiv. Mus. Hist. Nat., Paris (3) ii, p. 205 (1893).

According to Bigot (*loc. cit.*, p. 206), the type of this species was collected in "Laos." The specimen itself (which the writer has been enabled to examine through the kindness and courtesy of Baron J. M. R. Surcouf), however, bears labels stating that it was obtained by M. Pavie in 1886, between Chantabun and Battambang, both of which localities are in Southern Siam. *H. cilipes*, which is not included in Dr. Barnes's collection, is represented in the British Museum (Natural History) by a solitary ♀ from Cambodia, 1909 (*John Surcouf*, presented by Baron J. M. R. Surcouf).

* This place-name is printed here and elsewhere as given on labels attached to the specimens concerned; extensive search in maps and gazetteers, however, has so far failed to identify this Siamese locality.

Genus **Tabanus**, Linn.

Hitherto, so far as it has been possible to discover, only three species of *Tabanus*—*T. rubidus*, Wied., *T. brunnipennis*, Ric., and *T. siamensis*, Ric.—have been recorded or described as occurring in Siam. In the following pages the number of recognised Siamese species of *Tabanus* is raised to fourteen, namely:—

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|------------------------------------|------------------------------------|
| 1. <i>Tabanus barnesi</i> , sp. n. | 8. <i>Tabanus striatus</i> , Fabr. |
| 2. „ <i>nigropectus</i> , Big. | 9. „ <i>virgulatus</i> , sp. n. |
| 3. „ <i>insidiator</i> , sp. n. | 10. „ <i>rubidus</i> , Wied. |
| 4. „ <i>praematurus</i> , sp. n. | 11. „ <i>pugnax</i> , sp. n. |
| 5. „ <i>finalis</i> , Walk. | 12. „ <i>pugiunculus</i> , sp. n. |
| 6. „ <i>rubicundulus</i> , sp. n. | 13. „ <i>agnoscibilis</i> , sp. n. |
| 7. „ <i>brunnipennis</i> , Ric. | 14. „ <i>siamensis</i> , Ric. |

It might be supposed, especially in view of what has been stated above with regard to the two species of *Haematopota* mentioned, that one or more of the four species of *Tabanus*—*T. leucosparsus*, *T. nigropectus* (*Bellardia nigropecta*), *T. (Atylotus) melanognathus* and *T. (Atylotus) laotianus*—described by Bigot (Nouv. Archiv. Mus. Hist. Nat., Paris (3) ii, pp. 203–205 (1890)) from material stated to have been collected by M. Pavie in the Laos Protectorate,* French Indo-China, would be likely to occur in Siam. As will be seen below, in the case at least of *T. nigropectus* this surmise is certainly correct.

Of the previously described species recorded in the following pages, two at least—*T. striatus*, Fabr., and *T. rubidus*, Wied.—are widely distributed in the Oriental Region. On the other hand, certain species (*T. barnesi*, sp. n., *T. insidiator*, sp. n., *T. praematurus*, sp. n.) described below appear to be closely allied to, if not the representatives of, other forms which occur in the Naga and Lushai Hills, Assam, so that in their cases the mountain ranges of Upper Burma would seem to form an effective barrier.

Although the subjoined Key has been tested and found sufficient for the determination of the extremely limited amount of material at present available to its author for comparison, infallibility under all circumstances is far from being claimed for it. Nevertheless, it is hoped that it may prove better than nothing, and may also serve to stimulate potential collectors of Tabanids in Siam.

Even assuming that no change in the nature of the characters employed in the Key will be necessitated by the acquisition of further material, it should be noted that, in the case of a given species shown in the table, these characters are only sufficient to distinguish it from the other species included in the present synopsis; they are not necessarily distinctive as regards additional species of *Tabanus*, which may ultimately prove to form part of the Siamese fauna.

It has been necessary to confine the Key to the female sex, since, in the case of the majority of the species tabulated therein, the male is at present unknown. Even so, the characters given for *Tabanus pugiunculus*, sp. n., are perhaps incorrect, since, as will be seen below (p. 453), it is not absolutely certain that the solitary female provisionally assigned to that species really belongs to it.

The number in square brackets [] after the name of a species indicates the serial position of the species in the ensuing pages.

Key to the Fourteen Species of Tabanus recorded below (Females only).

- 1 (2). Wings with first posterior cell closed and petiolate.

- (a) Scutellum smoke-grey pollinose and clothed with silvery-white hair, forming a sharp colour-contrast with remainder of body; smaller species, about 15 mm. in length *barnesi*, sp. n. [1]

* In Kertész's *Cat. Dipteriorum*, Vol. III, somewhat quaintly styled the *Laos Islands* ("Ins. Laos").

- (b) Scutellum not smoke-grey pollinose nor clothed with silvery-white hair, entire dorsum of thorax dark mouse-grey, clothed with blackish hair (abdomen black); much larger species, about 20 mm. in length *nigrotectus*, Big. [2]
- 2 (1). Wings with first posterior cell open.
- 3 (4). Colour of scutellum (and hind margin of scutum) sharply contrasting with that of dorsum of thorax between bases of wings; principal pale markings on dorsum of abdomen in shape of two transverse bands; small species *insidiator*, sp. n. [3]
- 4 (3). Colour of scutellum not sharply contrasting with that of thorax between bases of wings, but either identical or at most somewhat paler.
- 5 (6). Dorsum of abdomen beyond the base with paler markings confined to the extreme hind margins of the second and two following segments *praematurus*, sp. n. [4]
- 6 (5). Dorsum of abdomen not so marked.
- 7 (12). Dorsum of abdomen beyond the base with paler markings including or consisting of a series of median triangles or more or less triangular spots, either separate or in part confluent.
- 8 (9). Last two or last three segments of abdomen presenting a sharp colour-contrast with remainder; pale median triangles, large and broad* *siamensis*, Ric. [14]
- 9 (8). No colour-contrast between last two or last three segments of abdomen and remainder; ground-colour of dorsum of abdomen uniform.
- 10 (11). Median triangles or spots on third and two following abdominal tergites more or less confluent *finalis*, Walk. [5]
- 11 (10). Median triangles on second and three following abdominal tergites widely separate *rubicundulus*, sp.n. [6]
- 12 (7). Dorsum of abdomen beyond the base with paler markings including or consisting of a longitudinal median stripe—not triangles or spots, although exceptionally the longitudinal median stripe may take the form of a series of confluent truncate triangles.
- 13 (18). Paler markings on dorsum of abdomen consisting solely of a more or less distinct longitudinal median stripe (no admedian pale markings—not even a sharply defined, pale spot on each side of second tergite).
- 14 (15). Wings distinctly infuscated (strongly tinged with sepia) *pugnax*, sp. n. [11]
- 15 (14). Wings hyaline.
- 16 (17). Wing-stigma conspicuous; front relatively rather broad (4 to 4½ times as long as its breadth between the lower inner angles of the eyes) *pugimculus*, sp.n. [12]
- 17 (16). Wing-stigma inconspicuous; front narrow (about seven times as long as its breadth between the lower inner angles of the eyes) *agnoscibilis*, sp. n. [13]
- 18 (13). Paler markings on dorsum of abdomen, in addition to the longitudinal median stripe, consisting of an admedian stripe or an admedian longitudinal series of spots on each side, or at least of a sharply defined pale spot on each side of second segment.

* Owing to the completely denuded condition of the type and paratype of *T. siamensis*, Ric. (see below, p. 455), the only specimens of this species at present available, the absolute accuracy of this statement as to the triangles cannot be guaranteed, though the ground-colour presents indications which seem to warrant it.

- 19 (20). Admedian paler markings on dorsum of abdomen practically confined to second segment, which bears a pair of admedian spots (similar spots, if present on any of following tergites, usually much less distinct) *brunnipennis*, Ric. [7]
- 20 (19). Admedian paler markings on dorsum of abdomen not confined to a pair of spots on second segment, but much more extensive (see 18 above).
- 21 (22). Median longitudinal stripe on second abdominal tergite more or less obsolete, at least much less distinct and well developed than on following tergite. *striatus*, Fabr. [8]
- 22 (21). Median longitudinal stripe on second abdominal tergite not obsolete, in any case just as distinct and well developed as that on following tergite.
- 23 (24). Frontal callus blackish-brown; expanded portion of third segment of antenna cinnamon-rufous *virgulatus*, sp. n. [9]
- 24 (23). Frontal callus chestnut-brown or russet-coloured; expanded portion of third segment of antenna mainly or entirely blackish or blackish-brown *rubidus*, Wied. [10]

1. *Tabanus barnesi*, sp. n. (fig. 1).

♀. Length (one specimen), 15 mm.; width of head, just under 5 mm.; width of front at vertex, 0.6 mm.; between lower inner angles of eyes, 0.4 mm.; length of wing, 15 mm.

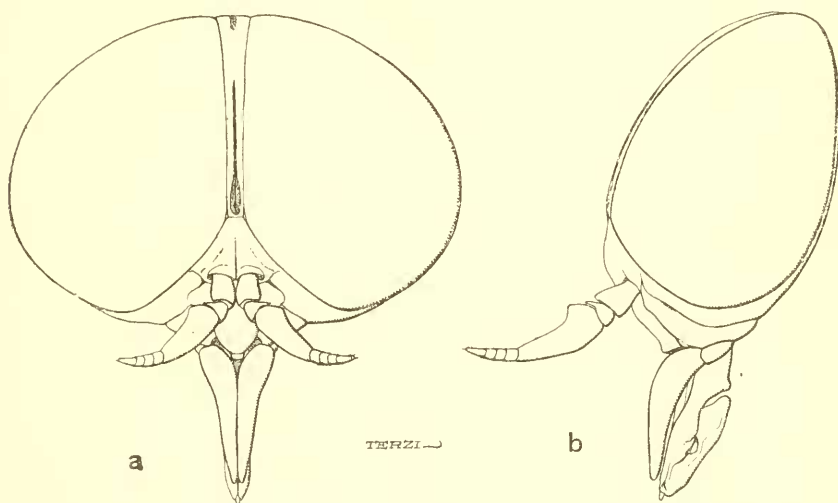


Fig. 1. Head of *Tabanus barnesi*, Austen, sp. n., ♀; a, front view; b, profile.

Dorsum of thorax, except scutellum, olivaceous-black,* scutellum, except extreme base, smoke-grey pollinose, clothed above with silvery white hair; abdomen black, first five (visible) tergites each with a transversely elongate patch of short, whitish, appressed hairs in each posterior angle; wings with costal cells light cinnamon-brown, and a mummy-brown transverse band before distal extremity; first posterior cell closed about 0.5 mm. from wing margin.

* For names and illustrations of colours used for descriptive purposes in the present paper see Ridgway, "Color Standards and Color Nomenclature" (Washington, D.C. Published by the Author, 1912).

Head: Subcallus drab, front, face and jowls greyish-olive pollinose, face and jowls clothed with fine dark-brown or blackish-brown hair, occiput pale smoke-grey pollinose, clothed with fine hair of similar colour, occipital margins fringed posteriorly with short, glistening yellowish hair, except behind vertex, where the somewhat longer hairs are blackish; *front* in ♀ narrow, somewhat wider above than below, clothed with minute, appressed, glistening yellowish hairs, vertex also bearing short blackish hairs, in typical specimen with a median, dark, somewhat shining, elongate mark, but showing no trace of an ocellar tubercle; *frontal callus*, blackish-brown, longitudinally elliptical in outline, and continuous above with a median rib-like extension of same colour, which, in case of typical specimen, reaches a point well above midway between lower end of *front* and hind margin of vertex; *eyes* bare, without recognisable bands in dried condition; *palpi*, drab, proximal segment clothed with fine dark brown or blackish-brown hair, distal segment in ♀ elongate, bluntly pointed at distal extremity, and clothed on outer surface with minute, appressed, black hairs, among which, especially at base above, a number of minute, glistening yellowish hairs is visible; first and second segments of *antennae* cinnamon-buff (pinkish-buff when viewed from above), clothed with minute black hairs, first segment partly embracing second, its upper distal angle being prominent, upper distal angle of second segment considerably produced, third segment cinnamon (infuscated at extreme tip in case of type), fairly deep at base, with a prominent though not elongate angle on upper border, after which expanded portion is somewhat elongate, the part of expanded portion beyond the angle being about twice the length of the part from base to angle inclusive, total length of annulate portion of third segment about half that of expanded portion. *Thorax*: Dorsum (except anterior border, humeral calli, and scutellum, with exception of its black base) clothed with black hair, which is thus present on base of scutellum also; humeral calli clothed with greyish-white hair, upper portion of anterior border of dorsum sparsely clothed with minute appressed, glistening yellowish hairs, a few similar hairs also present among the adjacent black hair; pleurae clothed partly with black, partly with brownish hair; anterior surface of thorax, next to occiput, olive-grey pollinose; pleurae and pectus dark brownish olive-grey pollinose, a thin coating of similar character and colour also present on dorsum of scutum, at least anteriorly, although, at any rate in a partially rubbed specimen, dorsum appears somewhat shining. *Abdomen*: Dorsum somewhat shining; whitish hairs forming lateral patches on dorsum fine and somewhat thinly set, lateral patches on first (visible) segment confined to the actual posterior angles, on following segments corresponding patches are much larger, each patch occupying on lateral margin at least posterior half of the segment, diminishing in depth towards middle line while remaining in contact with hind margin of tergite, and extending over about one-fourth (on fifth tergite about one-third) of the width of the segment; sixth tergite with a few scattered whitish hairs near each lateral extremity; dorsum, except as stated, clothed with short, appressed black hair; venter brownish-black, moderately shining, clothed with short, appressed black hair, among which on hind borders of second and two following sternites, and also scattered over surface of fourth sternite, are short or minute, glistening whitish hairs. *Wings*: Veins mainly dark brown, second longitudinal vein partly, third longitudinal at base, and anterior transverse vein tawny-olive; anterior branch of third vein (at least in type) with a small appendix (in case of type, more noticeable in right wing than in left); *stigma*, tawny-olive, elongate and inconspicuous; first basal cell faintly tinged with sepia; mummy-brown transverse band wider on costa than towards hind margin, and dying away before reaching latter, but extending into fourth posterior cell; on costa, band extends from a point about half-way along lower margin of stigma to end of first submarginal cell; thence, distal margin of band runs obliquely backwards, showing a more or less pronounced indentation in second submarginal cell; proximal margin of band straighter, running across wing practically at right angles to longitudinal axis of latter, and including distal extremity

of discal cell (in the case of the type, in practically every cell crossed by the band the latter is interrupted by a large hyaline streak, so that the band itself is composed of mummy-brown borders to the veins, but this condition is doubtless due to individual aberration). *Squamae*, deep mouse-grey, scantily fringed with fine yellowish hair; borders of *squamae* mummy-brown, outer edges ivory-yellow. *Halteres*, cream-buff, stalks and under surface of knobs more or less mummy-brown. *Legs*: entirely black and clothed exclusively with black hair; front tibiae not thickened; front tarsi in ♀ not conspicuously expanded, but with distal angles of penultimate segment considerably produced.

Chiangmai, 10.v.1921. With reference to the holotype of this species, Dr. M. E. Barnes, in whose honour the author has much pleasure in naming it, writes as follows:—"Caught at about 5.0 o'clock p.m., attacking me while I was seated on the verandah of my house; this is the only specimen that I have seen."

In addition to the foregoing specimen, the British Museum (Natural History) also possesses an old, considerably damaged, and much faded ♀ of this species, taken upwards of fifty years ago at Chantabun, S. Siam (— *Mouhol*), and formerly in the collection of the late W. W. Saunders. While certain differences from the specimen selected as the type are noticeable, none of the points as to which divergence appears can be regarded as more than varietal, and in some respects, as in the condition of the transverse band on the wing, the example from Chantabun is probably the more truly typical of the two. In the Chantabun ♀ the rib-like upward extension of the frontal callus is concealed by the pollinose covering of the front, from a point a little below the middle of the latter; so far as can be seen, there is no trace of lateral patches of whitish hair on the dorsum of the abdomen; the anterior branch of the third vein is without even a vestige of an appendix; and the mummy-brown transverse band on the wing is not interrupted by hyaline streaks.

Tabanus barnesi resembles *T. (Atylotus) nephodes*, Bigot, of which the type, from the Naga Hills, Assam (*Captain Butler*), and a second ♀, from Sibsaagar, Assam, are now in the National Collection. While agreeing with the species in question in its wing-marking, and in the first posterior cell being closed at some distance from the wing margin, *T. barnesi* is, however, distinguishable (in the ♀ sex) *inter alia* by its smaller size; by the frontal callus being, if anything, somewhat larger and more clearly differentiated from its rib-like upward extension; by the jowls, pleurae and lower part of the face being clothed with dark brown or black, instead of with whitish hair; by the dorsal surface of the scutellum, except at the base, being smoke-grey pollinose, and clothed with glistening silvery-white hair; by the total absence of median, white-haired triangles on the dorsal surface of the abdomen; and by the appendix to the anterior branch of the third vein, which is long in *T. nephodes*, being vestigial or absent.

2. *Tabanus nigrotectus*, Big.

Bellardia nigrotecta, Bigot, Nouv. Archiv. Mus. Hist. Nat., Paris (3) ii, p. 204 (1890).

Though stated by Bigot to be from "Laos," the type of this species, which Baron Surcouf has most courteously sent to the writer for examination, bears labels identical with those attached to that of *Haematopota cilipes*, Bigot (see above, p. 432). *T. nigrotectus* therefore occurs in Southern Siam. The species was not among those of which examples were forwarded by Dr. Barnes, but is represented in the National Collection by a ♀ from Cambodia, 1909 (*John Surcouf*, presented by Baron J. M. R. Surcouf).

3. *Tabanus insidiator*, sp. n. (fig. 2).

♀.—Length (five specimens), 10 to 10.6 mm.; width of head just under 4 to 4.5 mm.; width of front at vertex, 0.6 mm.; length of wing, 9.4 to 10 mm.

Pretty little species, with, in ♀, two frontal calli, bare eyes having apparently a single transverse purple band on level of lower callus, brightly marked body, and parti-coloured legs.—Pleurae light greyish-olive pollinose, scutellum pale olive-buff pollinose, both clothed conspicuously with pale yellowish hair; dorsum of abdomen mainly chestnut brown at base, then black or blackish-brown, third and fourth (visible) tergites each with a very conspicuous, pale (olive-buff pollinose) hind border, clothed with appressed glistening yellowish hair, and in each case expanded in middle into a wide, low triangle.

Head: Subcallus (in all five specimens available for comparison) shining russet-brown or mummy-brown, sometimes with a small, blackish-brown, median spot above bases of antennae; front greyish-olive pollinose, darker above, face and jowls pallid neutral grey pollinose, clothed with yellowish hair, upper extremities of sides of face immediately below subcallus usually mummy-brown pollinose, occiput smoke-grey pollinose, thinly clothed with pale yellowish hair, posterior orbits on each side of vertex fringed behind with minute black hairs mixed with minute, glistening yellowish hairs, posterior orbits elsewhere fringed with minute, glistening yellowish hairs; *front*, in ♀ of moderate width, somewhat narrower below than above, and in length equal to from five to six times its breadth between lower inner angles of eyes, clothed

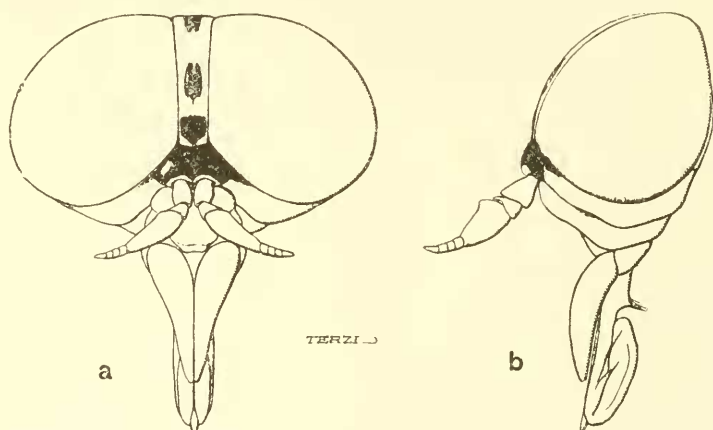


Fig. 2. Head of *Tabanus insidiator*, Austen, sp. n., ♀; a, front view; b, profile.

above with minute black hairs which are longer on vertex, where there is an ill-defined dusky patch but no trace of an ocellar tubercle; *frontal calli* (see fig. 2a), blackish-brown (lower callus sometimes reddish-brown), lower callus shield-shaped or quadrate, its lower margin (except point if shield-shaped) a little above level of lower inner angles of eyes, upper callus elongate quadrate or roughly elliptical, sometimes divided in middle line above, and in some specimens drawn out into a point below, or with a lower median extension which may or may not reach lower callus; *palpi*, neutral grey or deep neutral grey on outer, pallid neutral grey on inner surface, distal segment bluntly acuminate, moderately swollen at base, proximal segment, base and proximal two-thirds of lower margin of distal segment clothed with yellowish hair, outer surface of distal segment clothed elsewhere with minute, appressed black hairs; first two segments of *antennae* pale ochraceous-tawny, expanded portion of third segment tawny or russet, annulate portion cinnamon-brown, second segment and upper portion of first segment clothed with minute black hairs, first segment clothed below with yellowish hair and considerably swollen distally, having its upper distal angle moderately produced and partly embracing second segment, upper distal angle of latter small and not conspicuously elongate, expanded portion of third segment of moderate depth, varying from one-fourth as long again to nearly twice as long as annulate portion, angle on upper margin near base conspicuous

but not produced. *Thorax*: Dorsum—except fore border, scutellum, humeral and post-alar calli, swelling occupying depression at each end of transverse suture, a small area in front of suture immediately above each of these swellings, and extreme hind margin of scutum—blackish-brown, and clothed with similarly coloured hair; anterior surface and fore border of dorsum smoke-grey or light greyish-olive pollinose, the pollinose area extending on each side to transverse suture, and clothed with appressed, glistening yellowish hair; swelling in depression at each end of transverse suture, and area immediately above it in front of suture, pinkish-buff or cinnamon-buff, covered with olive-buff pollen and clothed with longer bright yellowish or ochreous hair, swellings at ends of suture also with a certain number of black or blackish hairs below; humeral and post-alar calli, and extreme hind margin of scutum pale smoke-grey pollinose, and clothed with yellowish hair; pectus agreeing with pleurae in coloration and hairy covering. *Abdomen*: First and second (visible) tergites mainly chestnut-brown, remainder of dorsum, except as already or subsequently described, black or blackish-brown; first (visible) tergite blackish-brown in centre; second tergite with a, not sharply defined, median triangular patch and a blotch on each side (not extending into posterior angle) of same colour; lateral extremities of first (visible) tergite, and posterior angles of second tergite, olive-buff pollinose and clothed with yellowish hair; hind margins of fifth and sixth tergites (sometimes that of seventh tergite also) narrowly olive-buff pollinose, and clothed, at least in part, with hair of same kind as that on hind borders of third and fourth tergites; dorsum, except as stated, clothed with short appressed black hair; venter at base, as far as hind margin of second segment, pale cinnamon or light pinkish-cinnamon pollinose, clothed with yellowish hair; remainder of venter agreeing with dorsum in coloration, markings and hairy covering, except that pale hind borders on third and fourth segments, though of same depth as above, do not exhibit median, triangular expansions. *Wings* strongly tinged with mouse-grey; veins mummy-brown or cinnamon-brown, anterior branch of third longitudinal vein almost rectangular at base, and with an appendix which varies in size in different individuals, and occasionally is entirely wanting; *stigma* tawny-olive, usually fairly well defined and conspicuous. *Squamae* dusky, borders dark brown, fringed with fine, short pale hair. *Halteres* dark brown or blackish-brown. *Legs*: Coxae and trochanters light greyish-olive pollinose, clothed with yellowish hair, hind coxae, at least in front, usually clothed mainly with black hair; femora black, usually more or less greyish pollinose, at least beneath, front femora clothed with black hair, those of middle and hind legs clothed partly with black, partly with yellowish hair; tibiae cream-buff, approximately distal third of front tibiae, and tips of middle and hind tibiae black or blackish-brown and clothed with black hair, cream-buff area of tibiae clothed with fine, glistening silvery hair, with which black hairs (sometimes especially numerous on extensor surface of hind tibiae) may be intermixed; tarsi black, clothed with black hair, third and fourth segments of front tarsi in ♀ only slightly expanded.

Holotype and four paratypes caught on Doi Chom Chang, near Chiengmai, N. Siam, alt. 5,000 ft., 16.iv.1921. With reference to these specimens, Dr. Barnes writes: "Taken while attacking me as I was walking through some jungle. This fly, the bite of which is quite painful, is very common in the jungle on the mountain."

The species just described, although strongly resembling and closely allied to *Tabanus* (*Atylotus*) *leucocnematus*, Big., is, in the ♀ sex, distinguishable therefrom *inter alia* by the frontal calli being wider apart; by the expanded portion of the third segment of the antenna being shorter and also deeper at the base; by the short appressed hair clothing the scutellum, post-alar calli, hind margin of the scutum, and hind borders of the third and fourth abdominal tergites being much paler; by the median triangular expansions of the abdominal bands in question being smaller; by the black or blackish-brown tips to the front tibiae being at least twice as deep; and by the wings being somewhat paler, more elongate, more acuminate, and having a more clearly marked stigma.

It may be added that, although the precise origin of the type of *T. leucocnematus*, Big. (now in the National Collection), is unknown, since Bigot (Mém. Soc. Zool., France, v., p. 657 (1892)) records it merely as "Indes," the specimen may well have been taken in Assam. At any rate, the British Museum (Natural History) possesses a second ♀ of *T. leucocnematus*, Big., which was captured at Kolasil, Lushai Hills, Assam, 30.vii.1904, by *Captain E. C. Macleod*.

4. *Tabanus praematurus*, sp. n. (fig. 3).

♀.—Length (one specimen) 16.2 mm.; width of head, 6 mm.; width of front at vertex, just under 1 mm., between lower inner angles of eyes, 0.4 mm.; length of wing, 15 mm.

Eyes bare, apparently with two (three?) purple bands; a single narrow, elongate, frontal callus in ♀; dorsum of thorax (scutum) tawny-olive pollinose, front and hind borders (including humeral and post-alar calli) and scutellum paler; abdomen, except first (visible) segment, warm blackish-brown (last three segments darker), hind margins of second to fourth tergites inclusive, and of fifth sternite narrowly whitish, and clothed

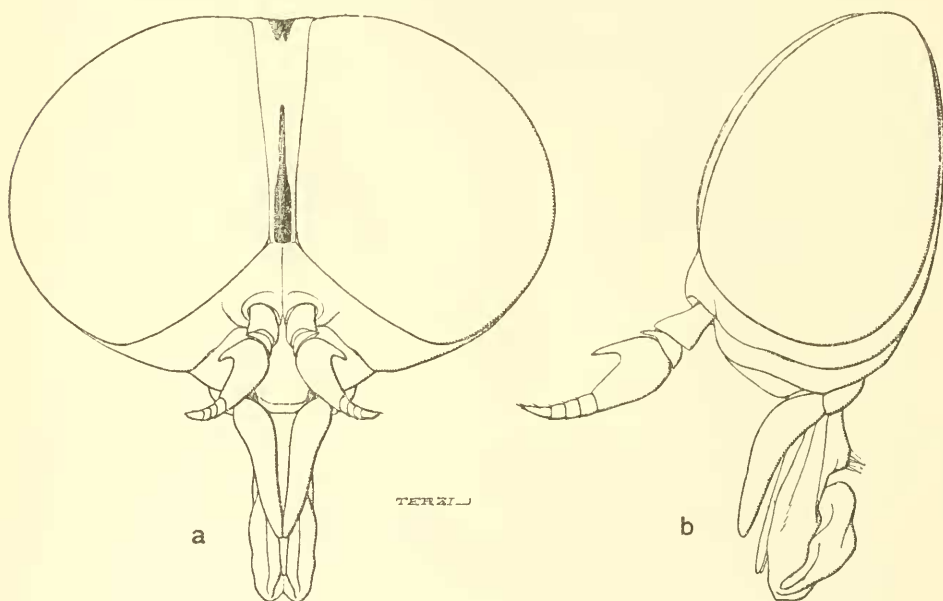


Fig. 3. Head of *Tabanus praematurus*, Austen, sp. n., ♀; a, front view; b, profile.

(except middle third in case of fifth sternite) with appressed yellowish or silvery-white hair, second to fourth sternites inclusive with deeper whitish-grey pollinose hind borders, especially towards the sides, clothed with appressed, glistening, silvery-white hair; wings with base, costal and basal cells tinged with tawny-olive, elsewhere, with exception of a larger or smaller hyaline fleck in almost every cell, suffused with sepia; legs, except coxae, trochanters, extreme tips of femora and bases of middle femora, uniformly blackish-brown or black.

Head: Subcallus, upper part of sides of face and lower half of front cinnamon-brown pollinose, upper half of front darker (mummy-brown), jowls and lower part of face buff-yellow pollinose, occiput ochraceous-buff pollinose, posterior orbits smoke-grey; upper part of sides of face clothed with dark brown hair, jowls and occiput clothed with buff-yellow hair, hind margin of occiput sparsely fringed above on each side of front with glistening hair of somewhat deeper tint; *front* in ♀ narrow

at its lower extremity, but from level of upper end of main portion of callus to vertex increasing considerably in width (see fig. 3a), sparsely clothed below and on lateral margins with appressed, glistening ochreous hairs, and above with short, erect blackish hair, vertex with a depressed, shining black median area shaped something like a truncate triangle, but with no trace of an ocellar tubercle; *frontal callus* blackish-brown, narrow and elongate, its upper extremity produced into a stout, linear extension, slightly longer than main portion of callus, and reaching to a point a little above midway between level of lower inner angles of eyes and hind margin of vertex; proximal segment of *palpi* clothed below with buff-yellow hair and on upper border of outer side with black hair, distal segment in ♀ acuminate and rather narrow, mouse-grey on outer side except at extreme base, inner side and extreme base of outer cinnamon-drab, outer surface clothed with minute, appressed black hairs, a few glistening buff-yellow hairs at base below; first and second segments of *antennae* light fuscous or olive-brown, clothed with black hair, first segment broadening from base to tip, with its upper distal extremity partially enveloping second segment, upper distal angle of latter strongly produced, third segment russet, expanded portion slightly longer than annulate portion, fairly deep at base, with angle on upper border strongly produced upwards and forwards (see fig. 3). *Thorax*: Pleurae dark olive-buff pollinose, scutellum somewhat paler pollinose, dorsum of scutum (in partially rubbed specimen) with more or less distinct traces of four ill-defined, dark brown, longitudinal stripes; dorsum of scutum clothed with fine, erect, glistening honey-yellow hair, pleurae and dorsal surface of scutellum clothed with similar hair of a paler (yellowish) tint. *Abdomen*: Tergite of first (visible) segment isabella-coloured, clothed with fine, short, appressed, glistening honey-yellow hair; remaining tergites clothed for most part with short, appressed, black hair, with which on central portion of second tergite honey-yellow hair like that on first tergite is freely mingled; hair clothing whitish pollinose hind margins of second to fourth tergites mainly silvery-white, but some glistening honey-yellow or ochreous hairs also present on or just in front of hind margins of second and third tergites, except at sides; venter at extreme base greyish-olive or neutral grey pollinose; sternite of (nominal) second segment, on each side in front of hind border, clothed for most part with minute, appressed, glistening yellowish hairs; seventh segment clothed above and below with longer black hair; sternites of (nominal) second and following segments, except as already stated, clothed with minute, appressed black hair. *Wings*: Stigma ochraceous-tawny, elongate and tapering; costa, and main stem of third longitudinal vein except at base, mummy-brown, veins otherwise for most part cinnamon-brown or amber-brown; in addition to usual hyaline streak in base of marginal cell, before stigma, and usual hyaline spot on fourth longitudinal vein, immediately before origin of anterior basal transverse vein, all cells, except costal, basal and anal cells, show—at least in typical specimen—a more or less distinct hyaline mark, varying in size and shape in the different cells. *Squamae* pale isabella-coloured (margins lighter or darker according to incidence of light), fringed with pale yellowish hair. *Halteres* cream-buff, base of knobs (in dried condition) cinnamon-brown. *Legs*: Coxae dark olive-buff pollinose, clothed with yellowish hair like that on pleurae; front and hind trochanters mouse-grey, hind pair clothed partly with yellowish, partly with dark brown hair, trochanters of middle legs cinnamon, with darker markings; middle femora cinnamon at base, extreme tips of all femora cinnamon-buff; tibiae, tarsi, and femora for most part clothed with black hair, posterior surface of middle femora, except at tips, clothed with long and fine yellowish hair, glistening ochreous hairs also present at base of middle femora in front, and at base of hind femora above and below, front femora fringed posteriorly with fairly long black hair; front tibiae not thickened, second and following segments of front tarsi, especially fourth segment, considerably expanded in ♀; claws long, entirely black; pulvilli ochraceous-buff.

Doi Chom Chang, near Chiangmai, alt. 5,500 ft., 15.iv.1921. Writing of the holotype of this species, Dr. Barnes says: "This specimen was caught while attacking

me at dawn in my cottage. On three mornings I was awakened about day-break by attacks by one or more of these flies, which I did not see on any other occasion."

The species described above is allied to *Tabanus manipurensis*, Ric., represented in the British Museum (Natural History), by the holotype ♀ from Ukhrul, Manipur, alt. 6,400 ft. (Rev. W. Pettigrew). Although not unlike *T. manipurensis* in general appearance, *T. praematurus* is distinguishable, *inter alia*, in the ♀ sex by the front being narrower below; by the expanded portion of the third segment of the antenna being much shorter, and having the angle on its upper border much more strongly developed; by the tibiae being uniformly blackish-brown or black instead of conspicuously creamy-white or cream-buff except at the distal extremity and extreme base; and by the greater breadth of the last three joints of the front tarsi.

5. *Tabanus finalis*, Walk.

Tabanus apicalis, Walk., List. Dipt. Ins. in coll. Brit. Mus., i, p. 176 (1848).—*Nomen bis lectum*.

Tabanus finalis, Walk., *op. cit.*, v. Suppl. i, p. 258 (1854).

Although this species is not included in Dr. Barnes's collection, the British Museum (Natural History) possesses a single ♀ of it taken in Siam (precise locality uncertain), 3.ii.1914, "at light" (K. G. Gairdner). The provenance of the type (a ♂) is unknown.

Tabanus finalis is a fairly large (about 18 mm. long), blackish-brown insect of striking appearance, recognisable by the presence of a large, cream-buff median spot on each abdominal tergite from the third to the fifth, inclusive; on the second (visible) abdominal tergite there are three small pale spots in a transverse row, of which the middle one is drab-coloured, while the two lateral ones are smoke-grey; the wings are infuscated, and the veins in the central area to a greater or less extent have brownish borders.

6. *Tabanus rubicundulus*, sp. n. (fig. 4).

♀.—Length (two specimens) 18 to 19 mm.; width of head, 5·6 to 6 mm.; width of front at vertex 0·75 mm., between lower inner angles of eyes 0·4 mm., length of wing 16·25 to 17·2 mm.

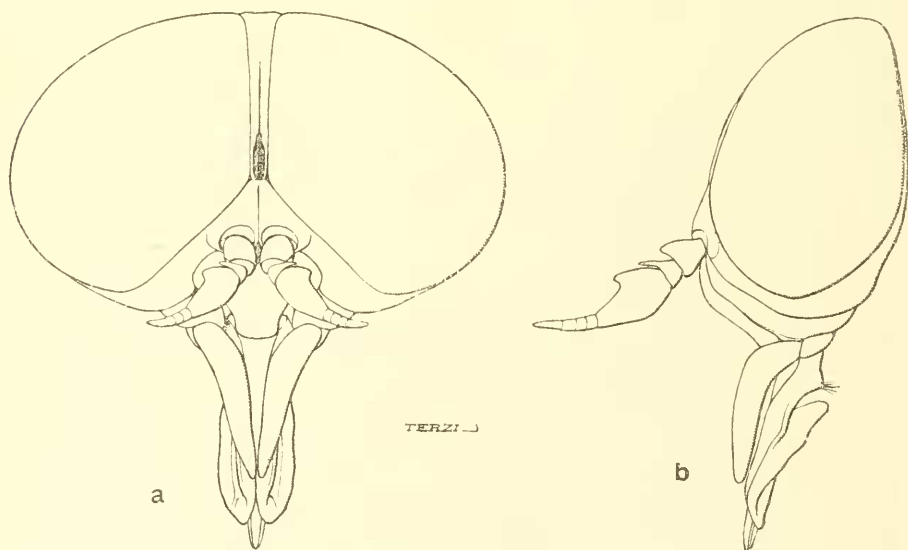


Fig. 4. Head of *Tabanus rubicundulus*, Austen, sp. n., ♀; a, front view; b, profile.

Eyes bare; a single elongate frontal callus in ♀; ground-colour of dorsum of body chestnut-brown; dorsum of abdomen with a median series of conspicuous, light buff

triangles; anterior branch of third longitudinal vein in wing with a well marked recurrent appendix.

Head: Front and subcallus olive-buff pollinose, upper half of front appearing darker when seen from certain angles (looking almost mummy-brown when viewed at a low angle in an antero-posterior direction); face, jowls and occiput pale smoke-grey pollinose, clothed with whitish hair, upper extremities of sides of face faintly suffused with sepia and clothed with dusky or blackish hair, hind margin of upper part of posterior orbits with an inconspicuous fringe of very short black hair, front in ♀ clothed with minute dusky hairs; *front* in ♀ narrow, diminishing in width from above downwards, and about eight or between eight and nine times as long as its breadth between lower inner angles of eyes, ocellar tubercle wanting; *frontal callus* (see fig. 4a), dark chestnut-brown, vertically elongate (roughly elliptical—its base just above lower inner angles of eyes), exhibiting a median impressed line, and continued above into a linear prolongation; *palpi* in ♀ drab-coloured, proximal segment clothed with whitish hair, distal segment narrow and elongate, blunt at tip and but little thicker at base, clothed on outer surface with minute, appressed black hairs; *antennae*, russet, first and second segments clothed with minute black hairs (with yellowish hairs on lower margin of their distal extremities), first segment somewhat greyish pollinose above, strongly swollen distally, its upper distal angle produced and partly embracing second segment, upper distal angle of latter considerably elongate, expanded portion of third segment in ♀ of considerable depth at base, not elongate and having a prominent, blunt angle half-way along its upper margin, annulate portion of third segment (dark chestnut-brown in case of type) about one-fourth shorter than expanded portion. *Thorax:* Dorsum, including scutellum, thinly, pleurae and pectus densely smoke-grey pollinose; dorsum, including scutellum, clothed with semi-erect black hair, mixed with fine, appressed or recumbent, ochreous or yellowish hair, a tuft of whitish hair also present above base of each wing and on post-alar calli; swelling occupying depression at each end of transverse suture, as well as post-alar calli in part and a small area on each side behind and above tuft of whitish hair above base of wing clothed with black hair; pleurae and pectus clothed with whitish hair. *Abdomen:* tergites of second to fifth segments inclusive each with a light buff, median triangle resting on its hind margin, the triangle in each case being formed by a patch of appressed, glistening straw-yellow hairs clothing a light buff pollinose triangular area; in case of holotype and paratype, triangle on second segment is isosceles, and its apex extends somewhat beyond middle of length of segment, while remaining triangles are equilateral and, except in case of triangle on fifth tergite, do not extend as far as middle of their respective segments; lateral extremities of first (visible) tergite pallid neutral grey pollinose, ground colour of lateral extremities, or at least posterior angles of following five tergites ochraceous-tawny; lateral extremities of first (visible) and three following tergites clothed with whitish or silvery-white hair; a small, triangular patch of appressed, glistening straw-yellow hairs on hind margin of first (visible) tergite in middle line, sixth tergite with a more or less distinct, median triangular patch of similar hair, interspersed with minute black hairs, the patch resting on hind margin and showing individual variation in size, being sometimes very small, in other cases considerably larger, so that its apex almost reaches hind margin of preceding segment; owing to absence of a light buff, pollinose ground beneath the median patches of appressed straw-yellow hairs on the first and sixth tergites, these patches are somewhat inconspicuous and do not appear as clearly defined triangles, contrasting sharply with surrounding area, as in the case of the median markings on the four intervening segments; fourth and fifth tergites with a few glistening straw-yellow hairs on their posterior angles; lateral extremities of last three, and hind margins of last two tergites clothed with black hair of moderate length; dorsum, except as stated, clothed with minute, appressed black hairs; venter russet, hind margins (or at least their lateral extremities) of second to fifth sternites, inclusive,

narrowly light buff or cream-buff, entire ventral surface with a thin, pale drab-grey, pollinose covering, which, however, when venter is viewed from behind at a low angle, allows a large, quadrate, not sharply defined, dark median blotch to be seen on each segment from second to sixth inclusive; venter clothed mainly with fine, minute black or blackish hair, seventh sternite clothed as usual with coarse, erect black hairs, lateral thirds of second sternite, lateral fourths of two following sternites except anteriorly, and posterior angles of fifth sternite clothed with glistening, appressed silvery white or yellowish hair, which is longer at lateral extremities of hind margins than elsewhere; entire hind margins of second to fourth (or perhaps, second to fifth) sternites inclusive, sometimes clothed with similar hair. *Wings* sepia-coloured (in life probably considerably darker), an ill-defined, slightly paler area in second submarginal cell; veins lighter or darker mummy-brown, anterior branch of third longitudinal vein forming a right angle with main stem, then bent at an obtuse angle, appendix (at least in case of type and paratype) between 0.4 and 0.5 mm. in length; *stigma* sepia-coloured or dark tawny-olive, narrow, elongate and tapering. *Squamæ* sepia-coloured, borders mummy-brown, fringed with short pale hair; *antisquamæ* fringed with longer whitish hair. *Halteres* cinnamon-brown, stalks, except distal extremities, and tips of knobs paler (light ochraceous-buff). *Legs*: coxae drab-grey pollinose, front coxae and outer surfaces of middle and hind pairs clothed with fine whitish or yellowish-white hair, lower surfaces of middle and hind coxae, and also part of lower portion of outer surface of middle coxae, clothed with black or blackish hair; femora russet-coloured, darker (more or less blackish-brown) above (at least in case of front legs), upper surfaces of femora clothed mainly with short, appressed black hair, mixed, at least in case of hind pair, with glistening ochreous or yellowish hairs, hind femora also with a tuft of whitish hair at base above; posterior surfaces of front and middle femora clothed with longer whitish hair (mixed above with black or blackish hair in case of front femora), hind femora, with longer whitish or yellowish-white hair below, and with whitish or ochreous hair on lower portion of anterior surface; front tibiae chocolate-brown or clove-brown, and clothed with minute, appressed black hairs, base on outer side paler (indistinctly russet), clothed with minute, glistening, appressed Naples yellow hairs; middle and hind tibiae russet-brown or russet, paler at base, clothed mainly with minute, appressed black hairs, proximal portion of inner surface in case of middle tibiae, and of outer surface in that of hind pair clothed with glistening, appressed, ochreous or yellowish hair, outer edges of extensor surfaces of hind tibiae fringed with longer black hair, flexor surfaces of hind tibiae sometimes largely clothed with appressed, glistening ochreous hairs; front tarsi black, third and following segments strongly expanded in ♀; middle tarsi blackish-brown, likewise with last three segments somewhat expanded; hind tarsi with first segment and proximal two-thirds of second segment russet, otherwise dark brown; all tarsi clothed above with minute black hairs.

S. SIAM: Chantabun (— *Mouhot*:—*ex coll.* the late W. W. Saunders).

In general appearance, as also in the markings on the dorsal surface of the abdomen, and in the narrowness of the front in the ♀, *Tabanus rubicundulus* resembles *T. indianus*, Ric. (Rec. Ind. Mus., Calcutta, iv., p. 175 (1911)), which, originally taken in India (North Kanara, Bombay Presidency), is also found in Hong Kong and Formosa. The new species described above may, however, at any rate in the ♀ sex, be distinguished from the one in question by its differently coloured legs (the femora being paler, and the proximal halves or three-fifths of the front tibiae not being cream-coloured), and by the presence of a well-developed appendix to the anterior branch of the third longitudinal vein.

7. *Tabanus brunnipennis*, Ric.

Tabanus brunnipennis, Ricardo, Rec. Ind. Mus., Calcutta, iv, p. 160 (1911).

Of this species, the type of which is from India (North Kanara), the British Museum (Natural History) possesses a ♀ from Bangkok, collected in 1898 by Major S. S. Flower, O.B.E. Apart from this specimen and the typical series, the only examples of the species as yet contained in the National Collection are from South Malabar (South-west India, a little to the south of the locality where the type and paratypes were obtained).

8. *Tabanus striatus*, Fabr.

Tabanus striatus, Fabricius, Entomologia Systematica, iv, p. 371 (1794).

Tabanus partitus, Walk., Journ. Proc. Linn. Soc., i, p. 9 (1857).

One ♂, Bangkok, 30.viii.1921, caught in donor's house at night, attracted by electric light; only specimen seen: one ♀, Chiangmai, 7.v.1921, on donor's verandah at dusk—a solitary specimen, which did not attack. Two ♀♀ of this species from Bangkok, taken respectively in 1907 (*Dr. P. G. Woolley*) and November 1919 (*F. J. Godfrey*), were previously included in the Museum collection.

The distribution of *T. striatus* is very wide, its range, as shown by material in the National Collection, extending right across the Oriental Region, from North-western and Western India (Kohat and Bombay) to Hong Kong and the Philippine Islands, and including the Federated Malay States, Singapore, Sumatra and Java.

According to Mitzmain,* who studied the bionomics of this species in the Philippines, and also in the same year (1913) demonstrated experimentally its capacity to act as a mechanical transmitter of surra,† *T. striatus* is "the most prevalent horsefly" in the Philippine Archipelago, where, although also attacking cattle and horses, it appears to prey by preference on the carabao (buffalo). As regards human beings, the author referred to writes: "During over two years of personal observation, this fly has never been known to annoy man in the Philippine Islands."

In the dried (pinned) condition, at any rate, apart from their usually darker appearance, specimens of *T. striatus*, especially when the median abdominal stripe is not obliterated on the second tergite, are sometimes liable to be mistaken for examples of *T. tenens*, Walk., of which *T. hilaris*, Walk. (Insecta Saundersiana, i, Diptera, pt. i, p. 49 (1850)), and *T. megalops*, Walk. (List Dipt. Ins. in coll. Brit. Mus., v, Suppl. i, p. 247 (1854)) are synonyms. So far as it is at present possible to judge, the range of *T. tenens* is much more restricted than that of *T. striatus*, though the evidence afforded by the series of specimens in the British Museum (Natural History) shows that this species is common in parts of India (*e.g.* Madras), and also occurs in Ceylon and Java. In the ♂ sex, excluding differences due to colour, *T. striatus*, Fabr., is distinguishable from *T. tenens*, Walk., by the distal margin of the penultimate segment of the front tarsi being more deeply notched. In its typical form, as represented by specimens from Hong Kong, the ♀ of *T. striatus* may be distinguished from that of *T. tenens*, *inter alia*, by the shape of the lower frontal callus, which is less elongate, *i.e.*, broader in proportion to its length; by the shape of the third and fourth segments of the front tarsi, the sides of these segments when the front legs are viewed from above appearing straighter; and by the legs in general being darker—the femora infuscated, and the front tarsi deep black instead of ferruginous or brownish.

Miss G. Ricardo, in her "Revision of the Species of *Tabanus* from the Oriental Region,"§ involves the identity and synonymy of *Tabanus striatus* in hopeless confusion, since *T. tenens*, Walk., and *T. megalops*, Walk., are included among the

* Cf. M. B. Mitzmain, "The Biology of *Tabanus striatus* Fabricius [*sic*], the Horsefly of the Philippines": Philippine Journ. Sci., viii, no. 3, Sec. B, Tropical Medicine, pp. 197-221, pls. I-VII (June 1913).

† Cf. M. B. Mitzmain, "The Mechanical Transmission of Surra by *Tabanus striatus* Fabricius" [*sic*]: *ibid.*, pp. 223-229 (June 1913).

§ Cf. G. Ricardo, "A Revision of the Species of *Tabanus* from the Oriental Region, including Notes on Species from Surrounding Countries": Rec. Ind. Mus., iv, pp. 150, 153 (1911).

synonyms of *T. striatus*, Fabr., while *T. hilaris*, Walk., is treated as a valid species. Curiously enough, in writing of *T. hilaris* Miss Ricardo says (*loc. cit.*, p. 153): "A species distinguished from *T. striatus*, F., by the short median stripe of abdomen, which does not begin till the third segment and by the shorter lateral stripes which usually terminate on the third or fourth segment." The author in question thus appears to regard as distinctive in comparison with *T. striatus*, Fabr., characters which are actually among those given by Fabricius himself as diagnostic of the latter species.†

It may be added that *Tabanus sinicus*, Walk. (List. Dipt. Ins. in coll. Brit. Mus., i, p. 163 (1848))—the type of which, from Hong Kong, is in the National Collection—though included by Miss Ricardo among the synonyms of *T. striatus*, is in reality perfectly distinct. Although allied to *T. striatus*, Fabr., it is, in the ♂ sex, readily distinguishable, *inter alia*, by the greater extent of the area of enlarged facets in the eyes, and by the absence of all trace of a dark band on this area.

The description of *T. striatus* given by Wiedemann (Auss. Zweifl. Ins., i, p. 155 (1828)) would appear to apply better to *T. tenens*, Walk., than to the true *T. striatus*, Fabr.

9. *Tabanus virgulatus*, sp. n. (fig. 5).

♀—Length (one specimen) 16 mm.; width of head, 5·75 mm.; width of front at vertex, 0·6 mm.; length of wing, 13·5 mm.

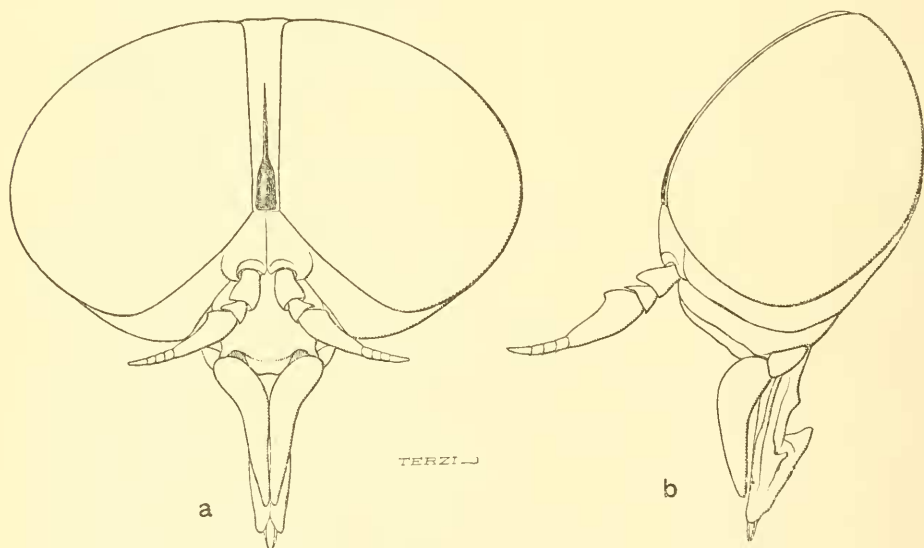


Fig. 5. Head of *Tabanus virgulatus*, Austen, sp. n., ♀; a, front view; b, profile.

Medium-sized species, with dark olive-grey thorax relieved by lighter stripes and dorsum of abdomen blackish-brown, bearing a sharply defined, light buff, longitudinal median stripe, and on each side of this, between it and lateral margin, a longitudinal series of somewhat fainter, light buff ovoid blotches or spots, diminishing successively in size towards posterior extremity, and disappearing before actually reaching it.

Head: Front and subcallus olive-buff pollinose, former clothed with minute blackish hairs above, and with similar pale hairs below; face, jowls and occiput pale smoke-grey pollinose, clothed with whitish hair, hind margin of upper part of posterior orbits

† Fabricius (*loc. cit.*) in his description of *T. striatus* writes: "Abdomen fuscum lineis tribus albis, lateralibus, a basi ad medium ductis, media a medio versus apicem."

fringed with very short and inconspicuous yellowish hair; *front* in ♀ of moderate width, which diminishes very slightly from above downwards, length of front equal to about six times its breadth between lower inner angles of eyes, vertex exhibiting a median, blackish, elongate mark, but ocellar tubercle wanting; a single *frontal callus* (see fig. 5), which is blackish-brown, bottle-shaped in outline and sharply defined, relatively fairly broad yet clearly though narrowly separated from each eye, its lower margin straight and on a level with lower inner angles of eyes, its upper extremity produced into a stout, tapering extension reaching to a point a little above half the length of the front; *eyes* bare (no trace of a band or bands visible in dried condition, in case of type); *palpi* pale pinkish-buff, proximal segment clothed with whitish hair (its outer surface—except tip, perhaps tinged with neutral grey), distal segment considerably swollen at base, then tapering to a slender point, its outer surface clothed with minute, appressed whitish or yellowish-white hairs, mixed with minute, appressed black hairs; *antennae* cinnamon-rufous, annulate portion of third segment (at least in case of type) blackish-brown, distal half of expanded portion infuscated on outer side, first segment light greyish pollinose above, clothed with minute black hairs on upper surface and with yellowish hairs below, its upper distal angle considerably produced and embracing second segment, latter small, its distal extremity ringed with minute black hairs, its upper distal angle small and sharp, not projecting beyond that of first segment, expanded portion of third segment in ♀ narrow and elongate (see fig. 5), with a sharp, prominent angle on upper margin a little beyond end of proximal third, length of annulate portion equal to about three-fifths of that of expanded portion. *Thorax*: Dorsum of scutum longitudinally striped with light olive-grey, in manner frequently seen in genus *Tabanus*—a short median stripe on front border, not extending quite half-way to transverse suture, and on each side of this, between it and lateral margin, a somewhat broader, uninterrupted stripe, reaching to posterior margin of scutum; lateral borders of scutum pale olive-grey, dorsal surface of scutellum unrelieved by lighter markings, its lateral margins light drab; dorsum, including scutellum, clothed with a mixture of minute, appressed cream-buff or yellowish hairs, and short, fine, erect blackish hairs; swelling occupying depression at each end of transverse suture mouse-grey, and clothed mainly with black or blackish hair; a strip on each side, commencing above base of wing and including lower border of post-alar callus, clothed with whitish or silvery-white hair; pleurae and pectus pale smoke-grey, clothed with whitish hair. *Abdomen*: Median stripe on dorsum commencing on first (visible) segment and terminating abruptly on hind margin of sixth, diminishing somewhat in width posteriorly and on second to fourth tergites, inclusive, clearly constituted in each case by a narrow truncate triangle, with its base resting on hind margin; ground colour of stripe smoke-grey pollinose; stripe thus formed is clothed with minute, appressed, glistening Naples yellow hairs, the combined effect being light buff; second to fifth tergites, inclusive, each with a light buff, longitudinally ovoid spot on each side, midway between median stripe and lateral margin, these spots or blotches similar in composition to the median stripe itself, but those on fifth segment very small and faint; sixth tergite on hind margin on each side with a small patch of appressed Naples yellow hairs, representing and in continuation of the spot on the preceding segment, more distinct vestiges of actual spots being visible on sixth segment when abdomen is viewed at a low angle from behind; ground colour of sides of second to sixth tergites, inclusive, cinnamon-rufous; lateral extremities and hind margin of seventh tergite cream-buff, clothed partly with glistening Naples yellow hair, and partly with longer black hair; lateral extremities of first (visible) tergite pallid neutral grey pollinose (posterior angles faintly pinkish-buff) and clothed with whitish hair, lateral extremities of following five tergites whitish pollinose, clothed with glistening whitish or silvery white hair, which towards and on hind margins of posterior segments may merge into glistening Naples yellow hair; dorsum, except as stated, clothed with minute, appressed black hairs; venter, except last segment, cinnamon-drab or light cinnamon-drab, with a more or less distinct though not sharply defined median, quadrate, mummy-brown blotch (resting on front margin but not

reaching hind border) on each segment from second to sixth, inclusive ; first (visible) ventral scute with a smaller, blackish, median quadrate blotch, which can be seen between the hind coxae ; seventh sternite mouse-grey, with a darker median blotch, smaller than that on preceding segment ; hind margins of second to sixth ventral scutes, inclusive, more or less distinctly cream-buff ; entire venter with a thin pollinose covering of pale smoke-grey, which, when abdomen is viewed at a very low angle from behind, entirely conceals the median blotches ; median blotches on fifth and sixth ventral scutes clothed with semi-erect black hair ; terminal segment, except towards lateral extremities of hind margin, clothed as usual with coarse, erect black hair ; venter, except as stated, clothed with short, appressed, glistening whitish or yellowish hair. *Wings* : Tinged with mouse-grey ; veins chiefly mummy-brown, in places, such as base of third and proximal portion of fifth longitudinal, paler ; *stigma* elongate, almost colourless and scarcely distinguishable. *Squamae* smoke-grey or drab-grey, with brownish borders clothed with pale hair. *Halteres* : Knobs cream-coloured, stalks sepia-coloured or paler. *Legs* : Coxae pale smoke-grey, clothed with whitish hair ; femora, except extreme tips, black or olivaceous black, with a pale, smoke-grey, pollinose covering, which is, however, largely wanting on the inner side of those of the front legs, and in case of middle and hind femora is denser on lower portion of outer surface than elsewhere ; extreme tips of front femora cream-buff, those of middle and hind pairs cinnamon-coloured, all femora clothed with whitish hair ; front tibiae, except distal third, which is blackish brown, cream-buff, clothed with minute, appressed, glistening cream-coloured hairs mixed with minute black hairs ; middle and hind tibiae pinkish-buff (their extreme tips reddish brown), middle tibiae clothed similarly to those of front pair with a mixture of minute cream-coloured hairs and black hairs, and with longer black hairs on posterior margin of extensor surface ; hind tibiae clothed mainly with minute, appressed, glistening cream-coloured hair, and having on outer margin of extensor surface a fringe of medium length composed partly of black, partly of cream-coloured hair ; front tarsi black, middle and hind tarsi dark brown or blackish-brown above, proximal segment in case of middle and hind tarsi somewhat paler at base ; all tarsi clothed above with minute black hairs, second and following (particularly third and fourth) segments of front tarsi considerably expanded, second and following segments of middle tarsi also somewhat expanded.

BANGKOK, November, 1919 (*F. J. Godfrey*).

The species just described, which is allied to *Tabanus striatus*, Fabr., and to *T. tenens*, Walk. (see above, p. 445), is distinguished from the former of these, in the ♀ sex, by the shape of the frontal callus ; by the median longitudinal stripe on the dorsum of the abdomen being as fully developed on the second segment as on the following ones ; by the outline of the third and fourth segments of the front tarsus, viewed from above being rounder ; and by the distal portion of the expanded part of the third antennal segment being narrower and more elongate. From *T. tenens*, Walk., the new species is distinguishable in the ♀ sex owing to the shape and darker coloration of the frontal callus, and to the expanded portion of the third segment of the antennae being more attenuate.

Tabanus virgulatus is also very closely akin to *T. rubidus*, Wied., and to the Indian *T. priscus*, Walk. (syn. *T. albimediis*, Walk.). As regards the former, it would seem that, in addition to the differences given in the Key above (see p. 435), *T. virgulatus* is distinguishable in the ♀ sex owing to the interval between the lower portion of the frontal callus and the eye on each side being distinctly narrower. It is quite possible that, when further material in good condition and from different countries is available for study and comparison, it will ultimately be found that both *T. virgulatus*, Austen, and *T. priscus*, Walk., are forms of a single widely distributed species, namely *T. rubidus*, Wied.

10. *Tabanus rubidus*, Wied.

Tabanus rubidus, Wiedemann, *Diptera Exotica*, i, p. 69 (1821).

Two ♀♀, foot of Doi Sutep (alt. *circa* 1,200 ft.), near Chiangmai, 7,9,iv.1921. Dr. Barnes's field-note on these specimens runs: "Caught while attacking my horse; a very common fly about horses in this locality."

As shown by the series of specimens of this species already in the British Museum (Natural History), the range of *Tabanus rubidus* extends at any rate from Bombay to Hong Kong, and includes Nepal, Burma, the Federated Malay States, Singapore, Cochin China and Annam. In Singapore, according to a note by Mr. P. S. Falshaw, *T. rubidus* bites cattle as well as horses; a ♀ from Pahang, Federated Malay States, 2,500 ft., 1916 (*T. R. Hubback*—presented by the Imperial Bureau of Entomology), was taken on a specimen of *Rhinoceros sumatrensis*, Cuv.

11. *Tabanus pugnax*, sp. n. (fig. 6).

♀.—Length (two specimens) 13.4 to 15.2 mm.; width of head, 4.5 to 5 mm.; width of front at vertex, just over 0.5 mm.; length of wing, 12.75 to 13.4 mm.

Eyes bare, apparently with three purple bands; a single elongate frontal callus in ♀; dorsum of thorax, including scutellum, olive pollinose overlaid with greyish,

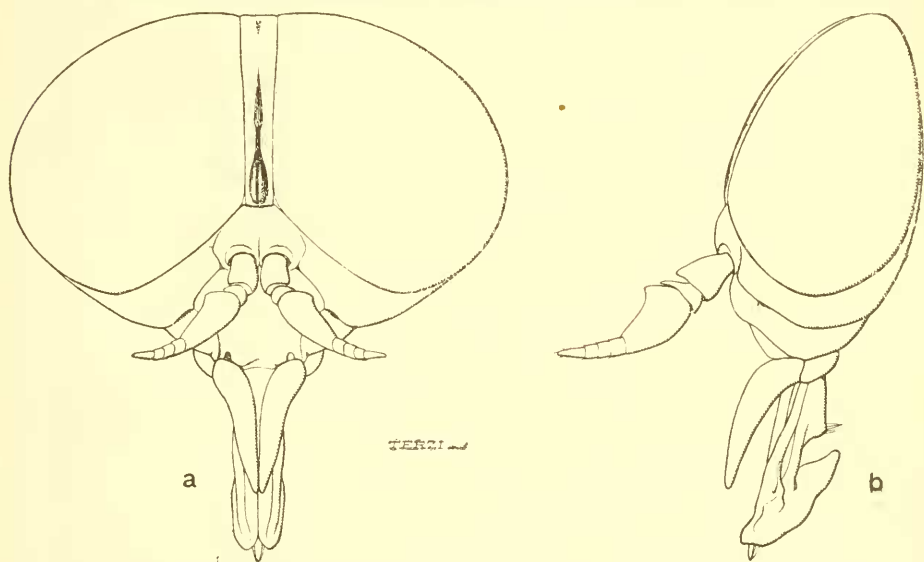


Fig. 6. Head of *Tabanus pugnax*, Austen, sp. n., ♀; a, front view; b, profile.

and uniformly clothed with appressed, glistening Naples yellow hair mixed with fine, erect black hair; dorsum of abdomen, brownish-tawny or brownish ochraceous-tawny, with a more or less conspicuous, median, longitudinal stripe extending from front margin of second (visible) to hind margin of fifth tergite, and composed of a continuous series of truncate, ochreous pollinose triangles, clothed with appressed, glistening buff-yellow hair; fourth and following tergites, otherwise than as already stated, and with exception of hind margins and posterior angles, mainly blackish-brown.

Head: Front ochreous pollinose, clothed, at least on upper half, with minute, fine black or blackish hairs, subcallus, face, jowls and occiput somewhat greyer (dark olive-buff pollinose), sides of face clothed with fine blackish hair, occiput, jowls and remainder of face clothed with pale yellowish hair, hind margin of occiput fringed above with very short and inconspicuous ochreous hairs, interrupted behind vertex by a series of somewhat longer fine black hairs; front in ♀ somewhat narrow or of medium breadth, slightly broader above than below, its length equal to about $7\frac{1}{2}$ or 8 times its breadth between lower inner angles of eyes, a narrow, dusky, indistinct, elongate triangular mark on vertex, but no trace of an ocellar tubercle; frontal callus (see fig. 6 a), black, bottle-shaped, its base on a level with lower inner angles of

eyes, its upper extremity produced into a lanceolate prolongation extending to a point about two-thirds of length of front above lower margin of latter, bottle-shaped portion marked with a narrow, vertical, median groove; proximal segment of *palpi* greyish-olive pollinose, clothed with fine, yellowish hair, distal extremity of proximal segment vinaceous-buff, sometimes with a few black hairs on outer side above, terminal segment pale cinnamon-brown, elongate and bluntly acuminate, but little swollen at base, clothed on outer surface with minute, appressed black hairs, and with a few minute yellowish hairs on proximal half of under surface; first and second segments of *antennae* cinnamon-drab, clothed with minute black hairs, first segment also with some yellowish hairs below, this segment considerably swollen distally and partially embracing second segment, upper distal angle of latter noticeably produced, third segment ferruginous or orange-cinnamon (terminal annulus blackish-brown in case of type), its expanded portion in ♀ fairly deep at base and not particularly elongate (in case of type, about one-third longer than annulate portion), with a blunt, but well-developed proximal angle on upper margin. *Thorax*: Dorsum somewhat more greyish on anterior border, immediately behind head; swelling in depression at each end of transverse suture agreeing in coloration with remainder of dorsum, but clothed for most part with black or blackish hair, upper and outer surfaces of post-alar calli also clothed mainly with black hair; pleurae and pectus greyish-olive pollinose, clothed with yellowish hair. *Abdomen*: Hind margins of third to fifth tergites, inclusive, narrowly ochreous pollinose, and clothed, at least in part, with short appressed hairs of same colour as those on median stripe; posterior angles of same three tergites and lateral extremities of sixth tergite ochraceous-tawny or cinnamon-buff; hind borders of sixth and seventh tergites more or less distinctly ochreous pollinose; second and third tergites sometimes with a more or less distinct blackish-brown blotch (not reaching hind margin, and larger in case of third tergite) on each side of median stripe, third tergite also with a faint blackish-brown blotch, not reaching lateral margin, at each lateral extremity; hind margin of first (visible) tergite, in median line, with a tiny patch of appressed, glistening, buff-yellow hair; lateral borders of first five tergites fringed with fine, pale buff-yellow hair; hind margin of sixth tergite with a few glistening buff-yellow hairs in median line; dorsum, except as stated, clothed with minute, appressed black hairs; venter cinnamon-coloured, extreme base smoke-grey, remainder when viewed at a low angle from behind seen to be suffused with a dark olive-buff pollinose covering, which is especially pronounced on last four segments; hind margins of second and following sternites deep olive-buff, and clothed with minute, appressed, glistening buff-yellow hairs (sometimes wanting in case of last segment); ground colour of last two sternites, except hind margins (and sometimes extreme lateral extremities of one or both), blackish-brown; second (or third) to fifth sternites, inclusive, sometimes each with a more or less distinct, iron-grey or dark olive-grey, quadrate median blotch, resting on base of segment in each case, but not reaching hind margin, in other cases ground-colour of fourth and fifth sternites, except lateral extremities and hind borders, mainly dark olive-grey; venter, except last segment and apart from what has already been stated, clothed partly with black, partly with appressed, glistening buff-yellow hair, the latter perhaps predominating on second and towards lateral extremities and hind borders of the four following sternites; terminal sternite as usual clothed for most part with longer, coarser, and more erect black hair. *Wings*: Strongly tinged with sepia; veins mummy-brown; *stigma* tawny-olive, narrow and elongate or sometimes inconspicuous. *Squamae* sepia-coloured, with darker borders fringed with pale hair. *Halteres* mummy-brown, stalks and tips of knobs sometimes paler. *Legs*: Coxae, greyish-olive, trochanters brownish-grey, clothed in each case with fine, pale yellowish hair; femora, except extreme tips, blackish-brown or olivaceous-black, more or less densely covered, at least in case of upper and outer sides of middle and hind femora, with greyish-olive pollen, and clothed with hair similar to that on coxae, tips of femora cinnamon-buff; tibiae cinnamon-coloured

(front pair sometimes cinnamon-buff), their distal extremities dark brown, front and middle tibiae clothed mainly with buff-yellow hair, distal extremities in both cases, and distal two-thirds of extensor surface of middle tibiae clothed with black hair, flexor surface of hind tibiae, except at tip, clothed with bright ochreous or ochraceous-orange hair, extensor surface of hind tibiae fringed with black, or black mixed with ochreous hair, tips of hind tibiae clothed with black hair; tarsi blackish-brown (first segment of middle tarsi more or less reddish brown), clothed above with minute black hairs, third and fourth segments of front tarsi in female moderately expanded.

Doi Chom Chang, near Chiengmai, alt. 5,500 ft., 12.iv.1921. Of the holotype and the single paratype of *T. pugnax*, Dr. Barnes writes:—"These flies attacked me at about 10 o'clock a.m., at an altitude of 5,500 ft.; this species is not uncommon."

What would appear to be a variety of *T. pugnax* is represented in the National Collection by two ♀♀ from Siam (precise locality unknown), taken at light, 3.iii.1914 (K. G. Gairdner). These specimens, which are in poor condition, shrunk and partly denuded, having originally been preserved in spirit, differ from the typical form as described above mainly in the coloration of the femora, which are largely or chiefly cinnamon or pinkish cinnamon-coloured, although, in the case of one specimen, those of the hind legs are in places strongly tinged with brownish.

The species just described is allied to *Tabanus fulvemedius*, Ric. (Rec. Ind. Mus., Calcutta, iv, p. 197 (1911)—*nec* Walk.), of Formosa, and to *T. fulvemedioides*, Shirak, (Blood-Sucking Ins. Formosa, Pt. 1, Tabanidae, Taihoku, p. 219, pl. v, fig. 8, pl. xi figs. 6, 7 (1918)), which is stated by its author to be fairly common in the south of Japan. From both of these, however, in the ♀ sex at any rate, *T. pugnax* is distinguishable by its narrower front; by the frontal callus (what is the lower callus in *T. fulvemedioides*, Shir., in which there are two frontal calli) being narrow and elongate, with its upper extremity—instead of suddenly and abruptly contracted, as in *T. fulvemedius*, Ric.—smoothly and directly continuous with the raised, lanceolate ridge representing the upper callus; and by the expanded portion of the third segment of the antenna being deeper and shorter.

12. *Tabanus pugiunculus*, sp. n. (fig. 7).

♂.—Length (one specimen), 13 mm.; width of head, 4.5 mm.; length of wing, 10.6 mm.

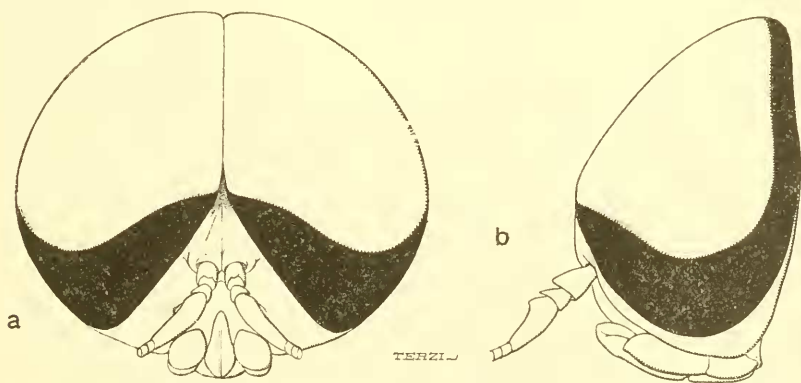


Fig. 7. Head of *Tabanus pugiunculus*, Austen, sp. n., ♂; a, front view; b, profile.

Dorsum of thorax, including scutellum, deep greyish-olive pollinose, uniformly clothed with minute, appressed, glistening Naples yellow hairs, mixed with fine, erect, cream-coloured hair; dorsum of abdomen russet, fifth to seventh segments, inclusive, except lateral and hind borders, olivaceous black, a smoke-grey pollinose, and from certain angles

not very conspicuous median longitudinal stripe, clothed with minute, appressed, glistening Naples yellow hairs, extending from base of second (visible) to hind margin of sixth tergite; wings hyaline, with conspicuous cinnamon-brown stigma.

Head: Rather less than upper half of frontal triangle in ♂ mummy-brown, remainder of frontal triangle pale olive-buff pollinose, face, jowls and occiput pallid neutral-grey pollinose, clothed with whitish hair, hind margin of upper border of occiput in ♂ without any noticeable fringe of hair; outer extremity of area of enlarged facets in eye of ♂ broadly and bluntly rounded off (see fig. 7), enlarged facets themselves conspicuously coarse, and below and at outer extremity of area sharply differentiated from smaller facets; posteriorly transition to smaller facets is more gradual, though a border, fairly uniform in width, of small facets runs up to and reaches vertical triangle; *palpi*, vinaceous-buff (proximal segment somewhat infuscated on outer side), clothed with hair like that on jowls, interspersed with which on outer side of distal segment are scattered, minute black hairs, distal segment cylindrical, bluntly pointed at tip, not conspicuously swollen; first segment of *antennae* in ♂ light ochraceous-buff, somewhat swollen distally but not embracing second segment, clothed above with minute black hairs and on outside and below with pale yellowish hairs, second segment ochraceous-tawny, its distal margin clothed on outer side with minute black hairs and its upper distal angle but little produced in ♂, third segment tawny (in case of type, distal extremity of expanded portion dark brown and last two annuli missing), expanded portion in ♂ elongate and somewhat narrow, with blunt but prominent angle on upper margin near base. *Thorax:* Dorsum showing indistinct traces of three longitudinal and incomplete, impressed, dusky lines; swelling in depression at each end of transverse suture pale ochraceous-buff pollinose, clothed with fine cream-coloured hair; swelling on each side above base of wing, behind end of transverse suture, pallid mouse-grey pollinose; *pleurae* and *pectus*, at least in type, blackish mouse-grey, clothed with fine, whitish hair. *Abdomen:* Lateral extremities, except lateral borders, of second to fourth tergites inclusive, at least in case of type, more or less dark brown; lateral and hind borders of fifth to seventh tergites, inclusive, as well as posterior angles of fourth tergite, cinnamon-buff or ochraceous-buff; lateral borders of first six tergites with a more or less distinct, pallid neutral-grey pollinose covering, and clothed with pale, whitish hair; first (visible) tergite, except narrow median area immediately behind scutellum, which is clothed with fine Naples yellow hair, and except its lateral borders, clothed with minute, appressed black hairs; second to sixth tergites, inclusive, except median stripe as described in diagnosis above, and except lateral borders, clothed with minute, appressed black hairs, interspersed with minute, appressed glistening Naples yellow hairs; seventh tergite in ♂ clothed exclusively with black hairs; ♂ genital appendages clothed above with black hair, sides of eighth segment in ♂ clothed partly with whitish or yellowish, partly with black hair; first three (visible) ventral scutes and base of fourth orange-cinnamon-coloured, last three ventral scutes and rather more than posterior half of fourth ventral scute, except hind border or hind margins in case of fourth to sixth scutes inclusive, olivaceous black; first three ventral scutes each with an ill-defined dark mouse-grey or olivaceous-black median blotch, not reaching hind border in either case, but otherwise quadrate and extending full length of segment in case of first two visible segments, transverse and occupying less than posterior half in case of third segment; posterior borders or margins of third to sixth ventral scutes inclusive cream-buff; entire venter light neutral grey pollinose, second (visible) and three following segments, as well as hind margin of sixth segment clothed with appressed cream-buff hair, last two ventral scutes clothed with erect black hair, coarser as usual in case of last scute, and mixed with minute, appressed cream-buff hairs in case of penultimate scute. *Wings:* Costa blackish-brown, veins otherwise mummy-brown. *Squamae* light drab, borders mummy-brown. *Halteres*, knobs blackish-brown or clove-brown, stalks tawny-olive. *Legs:* Front coxae light neutral grey pollinose, middle and hind coxae

neutral grey or deep neutral grey pollinose, all three pairs of coxae clothed with whitish hair; front femora olivaceous-black, neutral grey pollinose on outer side below, clothed with fine black hair, which on lower border of outer side of distal half is mixed with whitish or yellowish white hair; middle and hind femora mouse-grey (their distal extremities greyish cinnamon-coloured), clothed, except outer surface of middle femora, with whitish hair, outer surface of middle femora clothed with black hair; tibiae, except rather less than distal half in case of front pair, and rather less than distal fourth in that of middle and hind pair, ochraceous-tawny, distal extremities of front tibiae blackish-brown or olivaceous-black, those of middle and hind tibiae reddish-brown, tibiae clothed with black hair (flexor surfaces in case of middle and hind pairs clothed with appressed cinnamon-buff hair), extensor surfaces of hind tibiae (at least in ♂) fringed with fine and fairly long black hair; tarsi black (middle pair missing in case of type), first segment of hind pair paler (sepia-coloured), all tarsi clothed with minute black hairs.

Near Bangkok, vi.1921, caught in a railway carriage. With reference to this species, Dr. Barnes writes:—"I have seen a number of specimens of this fly."

What is quite possibly the opposite sex of *T. pugiunculus* to that of the type is represented in the National Collection by a solitary ♀ taken at Phrapatoon, in August, 1906 (*Dr. P. G. Woolley*). While agreeing with the type in many respects, such as in the presence of a pale (Naples yellow-haired) longitudinal median stripe on the dorsum of the abdomen, in the character of the wings (including the shape and coloration of the stigma), and in having strongly infuscated femora, this specimen exhibits certain differences—notably in the expanded portion of the third segment of the antennae being much deeper and entirely tawny (not dark brown at the tip); in the dorsum of the abdomen being mainly dusky (fuscous, or olivaceous-black), instead of russet with a dusky distal extremity; in the venter (apart from hind margins of segments) being uniformly neutral grey, without any trace of dark median blotches; and in the pale portion of the front tibiae being clothed with glistening yellowish (Naples yellow) hair. The *front* is relatively rather broad (4 to 4½ times as long as its breadth between the lower inner angles of the eyes); and there is a single, rather large, mummy-brown *frontal callus*, in shape resembling an isosceles triangle, with its lower margin just above the level of the lower inner angles of the eyes, and its upper extremity produced into a narrower extension, nearly one-third of the *front* in width, which dies away at a point about one-third of the length of the *front* from the hind margin of the vertex. The dimensions of this specimen are as follows: length, 10.5 mm.; width of head, 3.6 mm.; width of front at vertex, 0.5 mm.; length of wing, 9 mm.

As regards species liable to be confused with *T. pugiunculus*, it may be mentioned that the British Museum (Natural History) contains three ♂♂ of a (possibly undescribed) species of *Tabanus* from Lower Burma (base of Dawna Hills, 4.iii.1908, *Dr. N. Annandale*), which at first sight closely resemble that described above. These specimens, however, may be distinguished by *inter alia*, their smaller heads, the absence of a definite area of greatly enlarged facets in the eyes, and their pale femora.

Finally it may be remarked that *Tabanus pugiunculus* presents a certain superficial resemblance to the Javanese *T. cinerascens*, Big., but is distinguishable, *inter alia*, by its infuscated femora.

13. *Tabanus agnoscibilis*, sp. n.

♀.—Length (one specimen) 10.4 mm.; width of head, 3.2 mm.; width of front at vertex, 0.4 mm.; length of wing, 9 mm.

Small species, with apparently bare eyes, narrow front and single frontal callus in ♀, dorsum of thorax uniform deep greyish-olive, and tapering abdomen which, except last

three segments, which are blackish-brown, is ochraceous-tawny above; dorsum of abdomen also with a paler, median, longitudinal stripe.

Head: Subcallus and front in ♀ except vertex, tawny-olive pollinose, face, jowls, occiput and vertex pale smoke-grey pollinose, upper extremities of sides of face adjoining subcallus faintly tinged with tawny-olive; jowls and hinder edge of posterior orbits below clothed with pale yellowish hair, fringe of similar hair on hinder edge of upper part of posterior orbits so short as to be scarcely discernible; *front* in ♀ only very slightly narrower at lower than at upper extremity, and without trace of an ocellar tubercle; *frontal callus* tawny-olive, elongate and roughly longitudinally cylindrical-ovate in outline, with its lower end just above lower inner angles of eyes, and its upper extremity produced into a linear extension, the reddish-brown termination of which reaches to a point about half-way up the front; *palpi* pinkish buff, clothed on outer side with minute, appressed black hairs, proximal segment below with longer yellowish hair, distal segment in ♀ elongate acuminate, moderately swollen at base; first and second segments of *antennae* cinnamon-coloured (first segment somewhat pallid neutral grey pollinose above), clothed on outer surface with minute black hairs, first segment expanded as usual from base to tip, but its upper distal extremity not enveloping second segment, upper distal angle of latter not conspicuously produced (third segment wanting in case of type). *Thorax*: Dorsum, including scutellum, clothed with short, glistening, appressed Naples yellow hair, lateral border of dorsum and dorsal surface of scutellum smoke-grey pollinose, swelling occupying depression at each end of transverse suture with a vinaceous-buff ground colour, and sparsely clothed below with longer, erect black hair; *pleurae* and *pectus* smoke-grey pollinose, and clothed with fine whitish hair. *Abdomen*: Paler, median, longitudinal stripe light pinkish-cinnamon pollinose on ochraceous-tawny, smoke-grey pollinose on blackish-brown portion, extending from hind margin of first (visible) to hind margin of sixth tergite, inclusive, and clothed with minute, appressed, glistening Naples yellow hairs; lateral borders of first six tergites somewhat smoke-grey pollinose, and clothed with hair similar to that on median stripe; dorsum otherwise than as already stated clothed with minute, appressed black hairs; first four ventral scutes pinkish-cinnamon, clothed with minute, appressed, glistening Naples yellow hairs, last three ventral scutes blackish-brown; fifth and sixth ventral scutes somewhat greyish pollinose, clothed with appressed blackish hair, mixed on fifth scute with minute, glistening Naples yellow hairs, seventh ventral scute clothed as usual with coarse, erect black hair. *Wings*: Hyaline, with cinnamon-brown or paler veins; *stigma* ochreous, elongate, not conspicuous. *Squamae* light drab or drab-grey, with pale-haired borders. *Halteres* cream-buff, stalks somewhat darker. *Legs*: Coxae smoke-grey or mouse-grey pollinose, clothed with whitish hair; front legs, except coxae, blackish brown, distal fourth of front femora and rather less than proximal half of front tibiae cinnamon-coloured; middle and hind legs, except coxae, ochraceous-tawny, bases of femora and upper surface of tarsi, except practically whole of first and extreme base of three following segments, more or less dark brown; front legs, apart from coxae, mainly clothed with black hair, posterior border of upper surface of femora clothed with fine, yellowish hair; middle and hind legs clothed mainly with yellowish (yellowish white) hair, upper surface of hind femora and outer edges of extensor surfaces of hind tibiae also with minute black hairs; front tarsi not expanded.

SIAM (precise locality uncertain), 3.ii.1914, "at light" (K. G. Gairdner).

The type of this species might easily be regarded as a ♀ of *T. pugiunculus*, Austen, were it not for the exceedingly pale stigma, differently coloured halteres and much less infuscated femora. Should it after all prove to be conspecific with the ♂ that has been treated as the type of *T. pugiunculus*, the ♀ provisionally regarded as belonging to that species will represent a new one.

14. *Tabanus siamensis*, Ric.

Tabanus siamensis, Ricardo, Rec. Ind. Mus., iv, p. 212 (1911).

This species, the provenance of which is given by its author simply as "Siam," is not represented in the series obtained by Dr. Barnes. The type and paratype, both of which are completely denuded as well as somewhat shrivelled, and were evidently preserved in spirit before being pinned, are in the National Collection. A moment's glance at either specimen is sufficient to show that what Miss Ricardo describes as the "shining black" colour of the thorax is simply due to excessive denudation—doubtless caused by washing about while in alcohol. The pollinose covering of the dorsum of the thorax, of which vestiges are still conspicuous, is isabella-coloured, so that, although not the slightest trace of hair is now discernible on the dorsum, it is clear that, whatever be the actual colour of the latter in this species, it is certainly not "shining black."
